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The Excessive Profits of Defense Contractors: Evidence and Determinants

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Naval Postgraduate School

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14. ABSTRACT

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Preface & Acknowledgements

Welcome to our Ninth Annual Acquisition Research Symposium! This event is the highlight of the year for the Acquisition Research Program (ARP) here at the Naval Postgraduate School (NPS) because it showcases the findings of recently completed research projects—and that research activity has been prolific! Since the ARP's founding in 2003, over 800 original research reports have been added to the acquisition body of knowledge. We continue to add to that library, located online at www.acquisitionresearch.net, at a rate of roughly 140 reports per year. This activity has engaged researchers at over 60 universities and other institutions, greatly enhancing the diversity of thought brought to bear on the business activities of the DoD.

We generate this level of activity in three ways. First, we solicit research topics from academia and other institutions through an annual Broad Agency Announcement, sponsored by the USD(AT&L). Second, we issue an annual internal call for proposals to seek NPS faculty research supporting the interests of our program sponsors. Finally, we serve as a "broker" to market specific research topics identified by our sponsors to NPS graduate students. This three-pronged approach provides for a rich and broad diversity of scholarly rigor mixed with a good blend of practitioner experience in the field of acquisition. We are grateful to those of you who have contributed to our research program in the past and hope this symposium will spark even more participation.

We encourage you to be active participants at the symposium. Indeed, active participation has been the hallmark of previous symposia. We purposely limit attendance to 350 people to encourage just that. In addition, this forum is unique in its effort to bring scholars and practitioners together around acquisition research that is both relevant in application and rigorous in method. Seldom will you get the opportunity to interact with so many top DoD acquisition officials and acquisition researchers. We encourage dialogue both in the formal panel sessions and in the many opportunities we make available at meals, breaks, and the day-ending socials. Many of our researchers use these occasions to establish new teaming arrangements for future research work. In the words of one senior government official, "I would not miss this symposium for the world as it is the best forum I've found for catching up on acquisition issues and learning from the great presenters."

We expect affordability to be a major focus at this year's event. It is a central tenet of the DoD's Better Buying Power initiatives, and budget projections indicate it will continue to be important as the nation works its way out of the recession. This suggests that research with a focus on affordability will be of great interest to the DoD leadership in the year to come. Whether you're a practitioner or scholar, we invite you to participate in that research.

We gratefully acknowledge the ongoing support and leadership of our sponsors, whose foresight and vision have assured the continuing success of the ARP:

- Office of the Under Secretary of Defense (Acquisition, Technology, & Logistics)
- Director, Acquisition Career Management, ASN (RD&A)
- Program Executive Officer, SHIPS
- Commander, Naval Sea Systems Command
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- Director, Office of Acquisition Resources and Analysis (ARA)
- Deputy Assistant Secretary of the Navy, Acquisition & Procurement
- Director of Open Architecture, DASN (RDT&E)
- Program Executive Officer, Littoral Combat Ships

We also thank the Naval Postgraduate School Foundation and acknowledge its generous contributions in support of this symposium.

James B. Greene Jr.
Rear Admiral, U.S. Navy (Ret.)

Keith F. Snider, PhD
Associate Professor

Panel 13. Risk and Reward in Defense Contracting

Wednesday, May 16, 2012	
3:30 p.m. – 5:00 p.m.	**Chair: The Honorable Brian Miller,** Inspector General, U.S. General Services Administration ***The Excessive Profits of Defense Contractors: Evidence and Determinants*** Chong Wang and Joseph San Miguel *Naval Postgraduate School* ***Fixed-Price Development Contracts: A Historical Perspective*** William Lucyshyn, Jacques S. Gansler, and Jiahaun Lu *University of Maryland* ***A Quantitative Risk Analysis of Deficient Contractor Business System*** William Fast, *Naval Postgraduate School*

Brian Miller—The U.S. Senate confirmed Brian D. Miller as the Inspector General of the U.S. General Services Administration on July 22, 2005.

As Inspector General, Miller leads more than 300 auditors, special agents, lawyers, and support staff in conducting nationwide audits and investigations. As a national leader in the fight against procurement fraud, Miller participates in the U.S. Attorney General's Financial Fraud Enforcement Task Force and partners with federal, state, and local officials to share information to detect, investigate, and prevent procurement, Recovery Act, and grant fraud. Miller is a frequent speaker at conferences, task force meetings, and regional working groups, and he testifies regularly before Congress.

Before becoming Inspector General, Miller worked for the U.S. Department of Justice for 15 years, beginning in the Office of Policy Development. Attorney General Janet Reno appointed him as an assistant U.S. attorney for the Eastern District of Virginia, where he concentrated on procurement, grant, and health care fraud cases. In 2001, he served as the senior counsel to the deputy attorney general and special counsel for health care fraud for the U.S. Department of Justice. In 2002, he returned to the U.S. Attorney's Office to serve as counsel to the United States attorney, while continuing grand jury, trial, and appellate responsibilities as an assistant U.S. attorney.

Miller strives to provide aggressive, strategic, and creative leadership by developing new ways to fight fraud. In 2010, he established the Government Infrastructure Protection Initiative within his Office of Investigations to protect the federal procurement process and supply chain from the dangers associated with counterfeit products. In this effort, he partnered with the National Intellectual Property Rights Coordination Center. In 2008, he created a forensic auditing unit and sponsored federal forums to promote forensic auditing as a tool to analyze databases and to detect fraud. In 2006, Miller was named vice chair of the National Procurement Fraud Task Force, a task force of the Department of Justice, law enforcement offices, and several inspectors general. As co-chair of the Legislation Committee, he played a key role in amending the Federal Acquisition Regulation to require contractors to report overpayments and crimes. He was also a principal author of a legislative and regulatory reform white paper, which resulted in legislation, regulation, and a national debate on issues related to procurement fraud.

Miller has received notable recognition for his service as Inspector General. He was recognized by *Ethisphere Magazine* as the 12th "most influential person in business ethics" by a worldwide panel of experts. He was named among "Those Who Dared: 30 Officials Who Stood Up for Our Country," a

special report of Citizens for Responsibility and Ethics in Washington, a national advocacy organization. Miller also received the Attorney General's Award for Distinguished Service.

Miller has a Juris Doctor from the University of Texas.

The Excessive Profits of Defense Contractors: Evidence and Determinants[1]

Chong Wang—Wang is an assistant professor of financial management in the Graduate School of Business and Public Policy at the Naval Postgraduate School in Monterey, CA, where he teaches courses related to accounting and finance. His research fields are financial and management accounting, corporate finance, and economics. His latest research investigates the cost efficiency issue in the context of defense contracts. Professor Wang's work has been published in *Journal of Financial Economics*, *Advances in Management Accounting*, and *Accounting and Finance.* His latest working paper with his coauthors appears in the prestigious National Bureau of Economic Research (NBER) working paper series. He has presented his various working papers in a number of academic conferences, including the selective American Accounting Association Annual Meeting, and Western Finance Association Annual Meeting. His other DoD-related research projects include the impact of contract types on cost efficiency, as well the cross-sectional variation of defense contracts performance. Professor Wang has a PhD in economics and a Master of Science in statistics from Iowa State University, and a Bachelor of Science in management science from the University of Science & Technology of China. [cwang@nps.edu]

Joseph San Miguel—Professor San Miguel is an emeritus professor of financial management in the Graduate School of Business and Public Policy at the Naval Postgraduate School in Monterey, CA, where he teaches courses related to accounting and finance. Professor San Miguel was recently distinguish visiting professor at INSEAD–Singapore. He was the David T. McLaughlin distinguished visiting professor at the Amos Tuck Graduate School of Business, Dartmouth College. Also, he taught at the Harvard University Graduate School of Business; New York University Graduate School of Business; Stanford University Graduate School of Business; the Graduate School of Management, University of California–Davis; Peter F. Drucker Graduate Management Center, Claremont Graduate School; and The University of Texas at Austin. Professor San Miguel has engaged in consulting projects and executive development programs with such companies as Goldman Sachs, Analog Devices, Discover Financial Services, Harley-Davidson, Arthur Andersen, Lucent Technologies, Pacific Bell, General Electric, Digital Equipment, IBM, AT&T, Baxter International, and Harcourt General. He was employed by Mobil Oil Corporation and Anderson Clayton & Co. He serves on the Board of Directors of Jenzabar, Inc.

Professor San Miguel's Department of Defense and Department of the Navy research projects include the Naval Industrial Improvement Program for the Under Secretary of the Navy, the National Industrial Security Program for the Departments of Defense and Energy and the Central Intelligence Agency, and the Financial Management Executive Program for the Assistant Secretary of Defense for Health Affairs. For several years, he has been engaged in classified research for various federal national security agencies and defense organizations.

Professor San Miguel earned a PhD at The University of Texas at Austin. He is a certified public accountant and a member of Beta Alpha Psi, Beta Gamma Sigma, and Phi Kappa Phi honorary societies. His memberships in professional societies include the American Institute of Certified Public Accountants, American Accounting Association (Life Member Award), Institute of Management Accountants, and The Institute for Operations Research and Management Sciences. He served as a member of the Business and Industry Executive Committee, Management Accounting Executive Committee, and the Accounting Education Executive Committee of the American Institute of Certified Public Accountants.

Professor San Miguel's articles have been published in *The Accounting Review*; *The Journal of Corporate Accounting & Finance, Journal of Cost Management*; *Accounting, Organizations and Society*; *The Journal of Enterprise Management*; *The Accounting Journal*; *The Quarterly Review of Business and Economics*; and *Omega: The International Journal of Management Science*. He is coauthor of *Introduction to Financial Accounting* (Harper & Row); and author of *Cases in Financial*

[1] JEL Classifications: G38, H57, M48.

Accounting and Reporting, published by Touche Ross Foundation and the Harvard Business School; and author of *Value Chain Analysis for Assessing Competitive Advantage,* published by the Society of Management Accountants of Canada. He completed "Strategic Impact of Enterprise Resource Planning," sponsored by the Financial Executives Institute. Professor San Miguel has also written many cases at the Harvard Business School and the Naval Postgraduate School. His current research interests are in strategic enterprise management, global financial reporting, and the impact of technology on strategic planning and control systems. [jsanmiguel@nps.edu]

Abstract

A long controversial issue that divides academics, government officials, elected representatives, and the U.S. defense industry is whether defense contractors earn abnormal or excessive profits at the expense of taxpayers. Using an innovative industry-year-size matched measure of excessive profit, we demonstrate three findings. First, when compared with their industry peers, defense contractors earn excessive profits. This result is evident when profit is measured by return on assets (ROA), return on common equity (ROCE), and profit margin ratio (PMR). The evidence of excessive profit is less consistent if profit is measured by operating margin ratio (OMR). Second, defense contractors' excessive profit is more pronounced after 1992, consistent with the conjecture that the post-1992 significant industry consolidation enabled superior profitability due to both the improved bargaining power and increased political influence of the newly combined firms. Third, defense contractors' excessive profitability increases with poorer corporate governance, as measured by the duality of the chief executive officer (CEO) and the chairman of the board.

Introduction

A long-standing controversial issue that divides academics, government officials, elected representatives, and the defense industry is whether U.S. defense contractors earn abnormal or excessive profits at the expense of taxpayers. The Aerospace Industries Association (AIA; 2010), the premier association representing the nation's best-known names in the aerospace and defense industries, has consistently insisted that "defense industry profitability lags significantly behind its industrial peers." On the other hand, a General Accounting Office (GAO) report in the 1980s found that defense contractors normally earned a higher return on assets (ROA) than their commercial counterparts. The primary metric AIA uses is operating margin, measured as operating profit (earnings before interest and tax, or EBIT) as a percentage of sales. In 2009, the Institute for Defense Analyses (IDA) issued a U.S. Department of Defense (DoD)-sponsored report, "Defense Department Profit and Contract Finance Policies and Their Effects on Contract and Contractor Performance." The IDA report confirms that the operating margin of defense industry is lower than that of other sectors. However, the profit is "adequate" to sustain defense industry firms because they enjoy a more favorable financing structure under which the firm has much less of its own capital invested.

One might expect that as a more independent and relatively free-of-conflict-of-interest source of research, the academic literature should have provided more concrete and scientific evidence on this critical issue. Unfortunately, this is not the case. First, for whatever reason, there is a long history of avoidance of military-related research among academics. As a result, studies in this field are quite limited. Second, the already limited studies on this topic stopped in the 1990s, leaving a blank for almost two decades. Early evidence on the issue of excessive profits is mixed. For example, Weidenbaum (1968) argued that defense profits are excessive. Bohi (1973) used a sample of 36 defense contractors and concluded that "there is no evidence for arguing that defense business is any more or less profitable than nondefense business in general." Agapos and Galloway (1970) stated that "there is almost no evidence that aerospace firms in contemporary America are able to reap unusually large or excessive profits" (p. 1103). Stigler and

Friedland (1971) documented that the profit rates of top defense contractors substantially exceeded those of comparable nondefense companies. In summary, there was no consensus among academics in 1960s and 1970s.

The studies in the 1980s and 1990s are less divided in that generally they support the proposition that defense industries earn higher profits than their non-defense peers (Carrington, 1986; Trueger, 1991). For instance, Lichtenberg (1992) found that the ROA of defense contractors as a whole is 68–82% higher than that of non-contractors. Moreover, those firms with the most government contracts are almost three times as profitable as their benchmark firms. The major explanation of the excess profits of defense contractors is the cost-shifting hypothesis (Rogerson, 1992; Thomas & Tung, 1992). According to this theory, a typical defense contractor has two types of revenue. The first stream of revenue derives from the DoD products whose prices are cost based and hence are cost sensitive. The other source of revenue is from typical commercial products whose prices are competition based and therefore are cost insensitive. Rogerson (1992) argued that a firm with a combination of defense products and commercial products will have an incentive to shift the common overhead costs from cost-insensitive segments to cost-sensitive segments. Because government contracts typically are reimbursed based on costs and, more importantly, the price is determined based on negotiation between the two parties and often renegotiated, this cost shifting strategy effectively results in the firm's higher profitability.

The early evidence has been quite consistent with the cost-shifting hypothesis. For instance, Thomas and Tung (1992) found that pension plans are overfunded when employees work on government contracts, and those excess pension assets are withdrawn when employees work on non-DoD products. Rogerson (1992) not only documented the excess profitability of defense contractors, but also found that the defense product segments are significantly less capital intensive than less government-oriented segments, which is consistent with the cost-shifting hypothesis that predicts an input substitution effect (between capital and direct labor). Specifically, the cost-shifting theory conjectures that the defense product sector uses excess direct labor because the overhead allocation is traditionally based on direct labor-based measures.

A more recent study casts doubt on the validity of the cost-shifting hypothesis. McGowan and Vendrzyk (2002) confirmed that defense contractors enjoyed excess profit on their government work yet found no evidence of common overhead cost shifting. Specifically, they compared ROA among three types of segments within defense-contracting firms: (1) commercial segments, (2) government segments, and (3) mixed segments. The main testable hypothesis is as follows: if the cost-shifting theory underlies the excess profitability of defense contractors, one would expect to see the highest profit in the mixed segment, where managers have the most opportunities to shift common overhead costs. Opposite to what is expected, McGowan and Vendrzyk (2002) found that either the government segments (not the mixed segments) significantly outperform the other two segments, or there is no significant difference across the three categories, depending on the specific time period examined. The overall evidence suggests that unusually high profitability is more likely due to non-accounting explanations than to strategic cost allocation.

The objective of this paper is twofold. First, we fill in an almost two-decade gap that was left blank by the literature. Specifically, using up-to-date data, we investigate whether defense contractors earn excessive profits. Our contribution to this goal is beyond a pure extension of the timeline. We employ an innovative measure of excessive profit based on a three-dimension match of firms on industry, year, and size. This novel approach better captures the "excess" of the defense contractors' profitability, if any exists. Secondly, given

that we have found the evidence supporting the existence of defense contractors' excessive profits and the lack of consensus on the explanation of excessive profits, we provide alternative predictors of excessive profitability.

The remainder of the paper is organized as follows. In the Data section we describe our data. In the Empirical Analyses and Results section we introduce our industry-year-size matched excessive profit and the empirical results and findings based on this measure. In the Determinants of Excessive Profits section we hypothesize and find that industry consolidation after 1992 and the corporate governance quality are two determinants of excess profits. In the final section we conclude.

Data

Using Fedspending.org as the source, we first identified a list of the top 500 recipients (by dollars awarded) of defense contract awards for 2008. For each publicly traded company on the list, we used the stock ticker to merge with accounting data from the Compustat database. We were able to find a total of 112 public firms from this top 500 list. Table 1 reports the name, dollar awarded, rank, stock ticker, SIC code, and public stock exchange code for these 112 public firms.

Table 1. The Main Sample: 112 Public U.S. Firms From the 2008 Top 500 List

Company Name	Contracted_dollars_2008	Rank	Stock Ticker	SIC	EXCHG (11=NYSE, 12=AMEX, 14=NASDAQ)
LOCKHEED MARTIN CORP	$29,363,894,334	1	LMT	3760	11
NORTHROP GRUMMAN CORP.	$23,436,442,251	2	NOC	3812	11
BOEING CO.	$21,838,400,709	3	BA	3721	11
RAYTHEON CO.	$13,593,610,345	6	RTN	3812	11
GENERAL DYNAMICS CORP.	$13,490,652,077	7	GD	3790	11
UNITED TECHNOLOGIES CORP.	$8,283,275,612	8	UTX	3720	11
L-3 COMMUNICATIONS HOLDINGS	$6,675,712,135	9	LLL	3663	11
KBR INC.	$5,997,147,425	10	KBR	1623	11
NAVISTAR INTERNATIONAL CORPORATION	$4,761,740,206	11	NAV	3711	11
ITT CORPORATION	$4,355,423,578	13	ITT	3812	11
SCIENCE APPLICATIONS INTL CORP	$3,885,932,047	14	SAI	7373	11
GENERAL ELECTRIC COMPANY	$3,518,136,891	15	GE	9997	11
COMPUTER SCIENCES CORP.	$3,230,197,590	16	CSC	7370	11
HUMANA, INC.	$2,952,008,623	18	HUM	6324	11
TEXTRON, INC.	$2,827,900,303	19	TXT	3721	11
HEALTH NET, INC	$2,438,349,117	21	HNT	6324	11
URS CORP.	$2,402,033,979	22	URS	8711	11
HEWLETT-PACKARD CO.	$1,938,638,634	26	HPQ	3570	11
ALLIANT TECHSYSTEMS, INC.	$1,928,045,694	27	ATK	3480	11
OSHKOSH TRUCK CORP.	$1,863,726,822	30	OSK	3711	11
HARRIS CORP.	$1,841,470,263	31	HRS	3663	11
BP P.L.C.	$1,733,031,788	32	BP	2911	11
HONEYWELL, INC.	$1,721,547,997	33	HON	3728	11
ROYAL DUTCH PETROLEUM CO.	$1,712,005,958	34	RDS.A	2911	11

FORCE PROTECTION INDUSTRIES, (INC)	$1,360,427,189	36	FRPT	3790	14
CACI INTERNATIONAL INC	$1,324,104,004	37	CACI	7373	11
AMERISOURCE BERGEN CORP	$1,298,059,841	38	ABC	5122	11
ROCKWELL COLLINS	$1,290,813,364	39	COL	3728	11
SHAW GROUP, INC.	$1,162,267,243	40	SHAW	8711	11
VALERO ENERGY CORPORATION	$1,043,869,551	43	VLO	2911	11
JACOBS ENGINEERING GROUP INC	$951,295,410	45	JEC	1600	11
VSE CORP.	$910,970,473	47	VSEC	8711	14
MCKESSON CORPORATION	$903,799,326	48	MCK	5122	11
CARDINAL HEALTH INC	$856,333,988	50	CAH	5122	11
DELL COMPUTER CORPORATION	$852,813,703	51	DELL	3571	14
EXXON MOBIL CORP.	$836,548,150	52	XOM	2911	11
MANTECH INTERNATIONAL CORP	$655,579,972	61	MANT	7373	14
FLIR SYSTEMS, INC	$507,944,847	71	FLIR	3812	14
GOODRICH CORPORATION	$487,753,671	73	GR	3728	11
TETRA TECH, INC.	$472,960,770	77	TTEK	8711	14
IBM CORP.	$438,446,918	81	IBM	7370	11
PERINI CORP.	$436,363,793	82	TPC	1540	11
FLUOR CORP.	$430,878,065	84	FLR	1600	11
CERADYNE INC	$417,616,849	86	CRDN	3290	14
AECOM TECHNOLOGY CORPORATION	$380,250,228	91	ACM	8711	11
AT&T INC.	$371,099,463	95	T	4813	11
KRAFT FOODS INC	$367,840,952	97	KFT	2000	11
OWENS & MINOR INC	$365,861,498	99	OMI	5047	11
CUBIC CORP.	$354,623,567	102	CUB	3812	11
GREAT LAKES DREDGE & DOCK CORPORATION	$324,475,211	113	GLDD	1600	14
CATERPILLAR, INC.	$323,676,276	114	CAT	3531	11
PROCTER & GAMBLE CO.	$321,983,149	115	PG	2840	11
TYSON FOODS INC	$319,486,334	117	TSN	2011	11
VERIZON COMMUNICATIONS	$319,365,283	118	VZ	4812	11
CHEVRONTEXACO CORPORATION	$310,558,853	122	CVX	2911	11
SRA INTERNATIONAL, INC.	$297,913,799	128	SRX	7370	11
GRANITE CONSTRUCTION CO.	$292,263,100	131	GVA	1600	11
ACCENTURE	$288,517,607	132	ACN	8742	11
JOHNSON CONTROLS, INC.	$285,123,825	134	JCI	2531	11
GTSI	$271,996,636	141	GTSI	5045	14
EXPRESS SCRIPTS	$215,750,049	162	ESRX	6411	14
NCI INFORMATION SYSTEMS	$214,517,445	163	NCIT	7373	14
CONOCOPHILLIPS	$206,348,789	167	COP	2911	11
TYCO INTERNATIONAL LTD	$202,567,751	172	TYC	9997	11
COMTECH TELECOMMUNICATIONS CORP.	$202,082,670	173	CMTL	3663	14
GENERAL MILLS, INC.	$200,017,932	176	GIS	2040	11

TESORO HAWAII CORPORATION	$199,447,230	177	TSO	2911	11
AEROVIRONMENT INC	$192,462,098	182	AVAV	3721	14
SIEMENS AG	$192,129,128	183	SI	9997	11
AAR CORP.	$187,717,969	187	AIR	5080	11
SYSCO CORPORATION	$179,074,006	195	SYY	5140	11
REFINERY HOLDING COMPANY L P	$177,749,226	198	WNR	2911	11
DEERE & CO.	$164,340,456	206	DE	3523	11
VIASAT, INC	$156,815,300	217	VSAT	3663	14
TOTAL SA	$154,271,244	222	TOT	2911	11
ORBITAL SCIENCES CORP.	$153,884,356	223	ORB	3760	11
PEPSICO INC	$149,527,183	231	PEP	2080	11
UNISYS	$142,990,124	239	UIS	7373	11
TELEDYNE TECHNOLOGIES, INC.	$134,222,291	254	TDY	3663	11
BALL CORP	$131,696,095	259	BLL	3411	11
ELBIT SYSTEMS LTD.	$127,331,460	266	ESLT	7373	14
CONAGRA, INC.	$125,264,234	270	CAG	2000	11
ORACLE CORP.	$122,646,803	274	ORCL	7372	14
GENERAL MOTORS CORP.	$120,929,817	279	GM	3711	11
EATON CORP.	$117,792,917	286	ETN	3620	11
UNILEVER NV	$112,089,508	292	UL	2000	11
MOOG, INC.	$111,608,841	293	MOG.A	3728	11
ALON USA L.P.	$111,102,800	296	ALJ	2911	11
COCA-COLA ENTERPRISES INC	$93,991,833	343	CCE	2086	11
XEROX CORP.	$91,275,424	356	XRX	3577	11
JOHNSON & JOHNSON	$89,990,235	363	JNJ	2834	11
AMERICAN APPAREL INC	$89,975,062	364	APP	2300	12
CAMPBELL SOUP CO.	$88,645,010	367	CPB	2030	11
PHILIPS GLOEILAMPENFABRIEKEN	$83,662,212	387	PHG	3600	11
INTERMEC CORPORATION	$83,566,808	388	IN	3577	11
CAE CORP	$83,563,697	389	CAE	3690	11
IRIDIUM SATELLITE LLC	$80,141,588	408	IRDM	4899	14
TESORO PETROLEUM CORPORATION	$79,170,251	413	TSO	2911	11
DEL MONTE FOODS COMPANY	$77,962,809	419	DLM	2000	11
AMERICAN SCIENCE AND ENGRG	$76,545,302	429	ASEI	3844	14
CCI GROUP LIMITED LIABILITY COMPANY	$75,872,038	432	GIB	7373	11
MICHAEL BAKER CORP.	$74,263,592	437	BKR	8711	12
KIMBERLY-CLARK CORP.	$69,832,351	454	KMB	2621	11
ESTERLINE TECHNOLOGIES CORP	$68,716,933	462	ESL	3823	11
DYNAMICS RESEARCH CORP.	$67,638,183	470	DRCO	7373	14
INTEGRAL SYSTEMS, INC.	$67,261,245	473	ISYS	7373	14
MINE SAFETY APPLIANCES CO.	$67,166,647	474	MSA	3842	11
WORLD FUEL SERVICE CORP.	$66,258,375	478	INT	5172	11

SARA LEE CORPORATION	$65,361,053	482	SLE	2000	11
WILLIAMS COMPANIES INC	$65,024,852	483	WMB	4922	11
HORIZON LINES LLC	$65,008,856	484	HRZ	4400	11
CASE CORP.	$64,498,750	488	CNH	3523	11

Table 1 shows that the vast majority of firms in our sample are either traded on the NYSE or NASDAQ, consistent with the perception that top defense prime contractors tend to be big and established companies. Moreover, they are DoD contracts with a wide spectrum of industries. Table 2 illustrates the distribution of industry membership measured by two-digit SIC codes. In particular, our 112 sample firms cover 24 unique industry sectors as defined by two-digit SIC.

Table 2. The Distribution of 112 Sample Firms Across Two-Digit SIC Industry Sectors

Industry Name	2-digit SIC	Frequency
Transportation Equipment	37	15
Business Services	73	13
Petroleum Refining	29	11
Food & Kindred Products	20	10
Electronic Equipment & Components ,Except Computer Equipment	36	8
Measuring, Analyzing, And Controlling Instruments; Photographic, Medical & Optical Goods	38	8
Industrial & Commercial Machinery And Computer Equipment	35	7
Engineering, Accounting, Research, Management & Related Services	87	7
Heavy Construction Other Than Building Construction Contractors	16	5
Wholesale Trade-non-durable Goods	51	5
Communications	48	3
Wholesale Trade-durable Goods	50	3
Non-classifiable Establishments	99	3
Chemicals & Allied Products	28	2
Fabricated Metal Products, Except Machinery And Transportation Equipment	34	2
Insurance Carriers	63	2
Building Construction General Contractors	15	1
Apparel And Other Products Made From Fabrics And Similar Materials	23	1
Furniture and Fixtures	25	1
Paper & Allied Products	26	1
Stone, Clay, Glass, And Concrete Products	32	1
Water Transportation	44	1
Electric, Gas, And Sanitary Services	49	1
Insurance Agents, Brokers, And Service	64	1
		Total
		112

Table 3 presents basic statistics of various accounting measures for the 112 sample firms in fiscal year 2008. In particular, we report ROA, ROCE, total assets, revenue, profit

margin ratio (PMR), operating margin ratio (OMR), long-term debt ratio, and dollar awarded as percentage of revenue. The mean value of total assets and total revenue were $42 billion and $39 billion, respectively. The mean ROA (ROCE) was 5.76% (15.86%). Profit margin and operating margin averaged at about 5.19% and 9.76%, respectively. About 18% of assets were financed by long-term debt, and the government contracts contributed about 18% of the firms' 2008 revenue.

Table 3. The Basic Statistics of 112 Sample Firms in Year 2008

	Mean	Median	Min	Max	Std Dev
ROA(%)	5.76	6.21	-33.89	19.83	6.99
ROCE(%)	15.86	16.54	-206.49	112.29	34.45
Total Assets (millions)	38,737	7,433	147	797,769	92,650
Total Sales (millions)	42,034	14,246	160	458,361	79,559
PMR(%)	5.19	4.86	-20.71	24.05	6.05
OMR(%)	9.76	8.80	-8.04	36.79	6.67
Long-term debt ratio	17.84	16.23	0	63.57	13.12
Dollar awarded as percent of sales (%)	16.26	4.83	0.07	102.57	22.27

Notes. ROA = Net Income/Total Assets; ROCE = Net Income/Common Equity; PMR = Net Income/Sales Revenue; OMR = EBIT/Sales Revenue; Long-Term Debt Ratio = LTD/Total Assets

Empirical Analyses and Results

Measuring Excessive Profits

A challenging issue that contributes to the controversy over defense contractors' excessive profits is the definition of excessive profits. We argue that some approaches are fundamentally flawed. For instance, a very common and seemingly sensible method is to compare the profitability measures of defense contractors with similar measures of the member firms of an index. In a recent report, the AIA (2010) used the following figure to make the point that "defense industry profitability lags significantly behind its industrial peers."

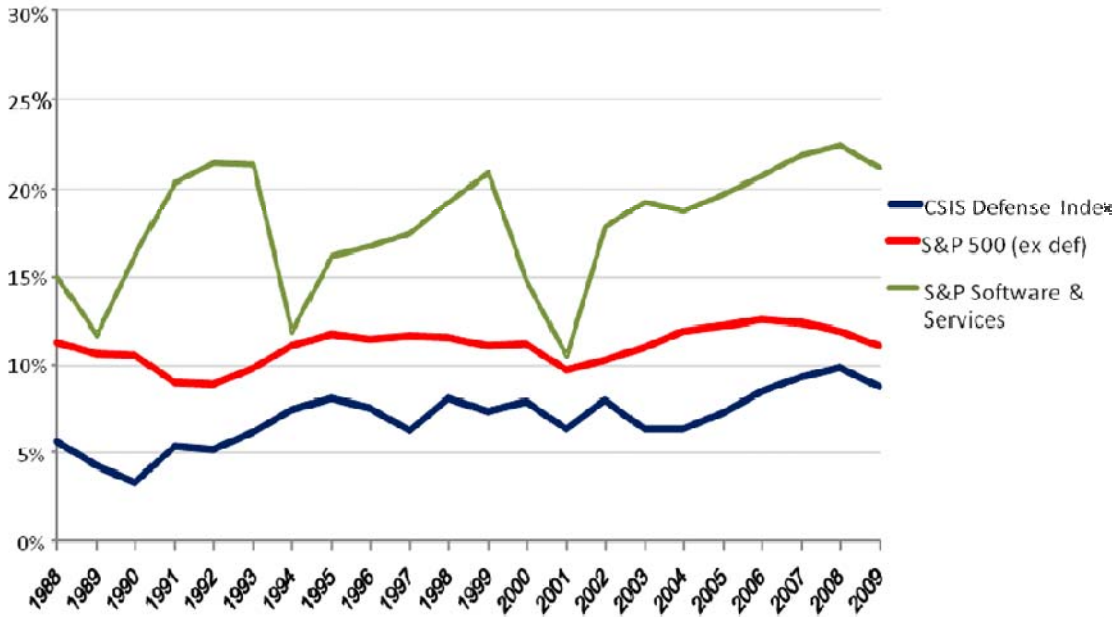

Figure 1. Defense Industry Operating Margin: Lowest Returns Among Its Peers
(AIA, 2010)

Notes. The information in this figure was taken from Bloomberg, and the analysis was done by CSIS Defense-Industrial Initiatives Group. CSIS Defense Index comprises 34 publically traded companies with majority of revenues derived from defense business. For the S&P 500, CSIS obtained historical data for the period 1988-2009 for the constituents as of July 2010.

This approach is also used by some defense-related research centers. A Center for Strategic & International Studies (CSIS) working paper by Berteau, Levy, Ben-Ari, and Moore (2011) compared operating profit margins for the CSIS Defense, S&P 500, and S&P 1500 Industrial Indices between 1990 and 2010. Berteau et al. (2011) claimed that although the CSIS Defense Index's operating margin is higher today than at any point in the past 20 years, it has been consistently lower than those of the commercial indices.

Worrying about the explicit and implicit inferences drawn from the above "defense versus S&P index" comparisons, we asked the following question: What implications concerning defense contractors' excessive profits, if any, can be drawn from these figures? Our answer is none. Just because we observed that defense contractors' operating margin (or any other profitability measure) is lower than that of the S&P 500 index does not necessarily rule out the possibility of defense contractors' excessive profits. The major reason is that it's meaningless to use a very broadly defined index as the benchmark for inferring the defense contractors' normal profitability. The defense contractors, as a whole or as individual firms, and the broad market are two different animals. Even a narrowly defined index, such as a manufacturing index, is problematic. The bottom line is this: The defense contractors span a wide range of industries. For instance, our 112 public U.S. firms on the 2008 top 500 list cover 24 unique two-digit SIC codes. If measured by four-digit SIC codes, the number goes up to 56 industries! As McGahan and Porter (2002) pointed out, profitability is very industry-specific. Different industries have different risk exposures, competitions, and entry barriers, among many others. Therefore, given the wide industry representation of defense contractors, the correct benchmark for inferring defense contractors' normal profitability (and hence excessive profitability) must focus on the individual firm level. There is no one-size-fits-all benchmark, not the S&P, not a manufacturing index, not any readily available index.

Based on the theoretical literature, we propose an innovative measure to assess the excessive profitability of defense contractors. McGahan and Porter (2002) documented the importance of year and industry on accounting profitability. Moreover, extensive literature demonstrates that firm size should be considered in constructing a benchmark for comparison (Albuquerque, 2009; Dechow, Hutton, & Sloan, 1996). Hence, we devised an industry-year-size matched excessive profit measure *for each individual firm-year* and in turn used it as the basis for analyzing our research questions.

Our excessive profit measure is defined as follows. First, we assumed that a significant contracting relationship continuity exists between the government and the defense contractors. Hence, we extended the use of our 2008 list of top defense contractors to all the other years as well. This likely introduces some noise into the data. However, because any noise only worked against finding any results, we were willing to sacrifice the power of the test in order to avoid extremely time-consuming data collection work. Second, for each of the 112 firms, we used their stock ticker to map into the Compustat database and extract various accounting variables across a wide range of years, 1950–2010. So a single firm on our list likely has multiple hits (each hit is a firm-year), depending on how long the firm has existed. Note that the maximum possible number of hits is 61 for any particular firm. We report that mapping our 112 firms to the Compustat database yields a total of 4,099 firm-years representing 110 firms (two tickers no hit). On average, the number of hits per firm is 37.26 with a min of four and a max of 61. Finally, for each of the 4,099 firm-years, we tried to find a benchmark firm-year whose profit becomes the proxy for "normal profit" of the firm-year investigated. The benchmark firm-year was selected based on a three-dimension match on industry, year, and size. Specifically, we went to *the same industry-year* where industry membership is defined as four-digit SIC codes and identified the *non-defense* (i.e., not on our 112-firm list) firm that has the best size match with our defense firm-year. The difference between the profit of the firm-year investigated and the profit of the benchmark firm-year is the measure of "excessive profit."

Empirical Results and Findings

Table 4. The Basic Statistics of 4,099 Sample Firm-Years During 1950–2010

	N	Mean	Median	Min	Max	Std Dev
ROA(%)	4,050	5.59	5.78	-87.55	76.91	6.16
ROCE(%)	3,567	14.28	13.79	-953.98	1274.14	56.67
Total Assets (millions)	4,058	16,048	1,763	0.40	797,769	51,793
Total Sales (millions)	4,058	14,716	2,430	1.35	458,361	35,979
PMR(%)	4,037	4.36	4.11	-99.74	100.22	5.92
OMR(%)	4,050	8.61	7.86	-98.62	40.31	6.64
Long-term debt ratio	4,057	16.09	14.63	0	83.40	12.21

Table 4 is similar to Table 3 except that we include all the 4,099 firm-years as opposed to only year of 2008. Note that due to missing values, the sample sizes for calculating various measures are less than 4,099 and vary across different metrics.

A comparison between Tables 3 and 4 shows that multiple year statistics, especially the mean and the median, are fairly close to the one-year 2008 statistics. The notable difference is that the firms' assets and sales are higher in 2008, which is pretty much expected.

Next we analyzed our key measure: excessive profit. Table 5 and 6 report the various measures of excessive profitability. Again, the sample size varies across different measures.

Table 5. The Excessive Profitability of 4,099 Firm-Years During 1950–2010: Panel A, Size Matched by Total Assets

	N	Mean	Min	Max	Std Dev	t	P-value
Excessive ROA(%)	3,809	1.12	-23.49	44.17	7.08	**9.77******	<0.0001
Excessive ROCE(%)	3,314	3.65	-143.64	175.57	25.73	**8.08******	<0.0001
Excessive PMR(%)	3,809	0.28	-31.82	74.56	7.87	**2.22****	0.03
Excessive OMR(%)	3,777	-0.09	-59.59	257.33	10.32	-0.52	0.60

Notes. ** indicates 5% significance level, *** indicates 1% significance level, **** indicates less than 0.01% significance level. Excessive measures are derived based on an industry-year-size matching. Industry is defined as four-digit SIC while the size is defined as total assets.

Table 6. The Excessive Profitability of 4,099 Firm-Years During 1950–2010: Panel B, Size Matched by Revenue

	N	Mean	Min	Max	Std Dev	t	P-value
Excessive ROA(%)	3,825	1.04	-21.89	44.37	7.29	**8.80******	<0.0001
Excessive ROCE(%)	3,246	3.71	-142.09	178.70	26.08	**8.10******	<0.0001
Excessive PMR(%)	3,825	0.45	-31.82	74.91	7.23	**3.85*****	0.0001
Excessive OMR(%)	3,793	0.35	-48.23	69.29	7.80	**2.77*****	0.006

Notes. ** indicates 5% significance level, *** indicates 1% significance level, **** indicates less than 0.01% significance level. Excessive measures are derived based on an industry-year-size matching. Industry is defined as four-digit SIC while the size is defined as total revenue.

Panel A of Table 5 (size matched by total assets) demonstrates that the average excessive ROA (ROCE) is 1.12% (3.65%), respectively, both statistically significant at less than 0.01% level. The excessive PMR is positive and has a mean of 0.28%, which is statistically significant at 5% level. The OMR, which is most often used by the defense industry to show the inferior profitability of the defense contractors, does appear to have a negative average excessive value. However, the magnitude (-0.09%) is too small to be statistically significant.

Panel B of Table 6 (size matched by revenue) provides similar evidence as Panel A of Table 5 except on OMR. The average excessive ROA (ROCE) is 1.04% (3.71%), respectively, both statistically significant at less than 0.01% level. The excessive PMR is positive and has a mean of 0.45%, which is statistically significant at 0.1% level. In contrast to Panel A, however, the OMR is positive and statistically significant as well, consistent with the other measures of profitability.

The overall evidence suggests that, measured by ROA, ROCE, and PMR, defense contractors consistently demonstrate superior profitability than their industry-year-size matched non-defense peers. Another important finding is that in contrast to what AIA claims, the OMR of defense contractors are at least *not* significantly lower than that of their industry-year-size matched non-defense peers.

Determinants of Excessive Profits

Time Series Variation Determinant: Industry Consolidation

We first investigated whether the industry consolidation in the past two decades has increased the defense contractors' excessive profit. In 1993, then-Deputy Secretary of Defense Bill Perry hosted a dinner that is now called "The Last Supper" with the CEOs of the major defense companies. During the dinner, Perry urged his guests to consolidate their industry because the DoD would no longer support the high infrastructure costs of a fragmented set of industries due to lower demand induced by the "peace dividend" from the end of the Cold War. As a result, a series of high-profile M&A happened in subsequent years including but not limited to the following cases: Boeing acquiring McDonnell Douglas, Lockheed acquiring Martin Marietta, and Northrop acquiring Grumman.

It is reasonable to assume that as the industry structure shifted toward a less competitive nature, the bargaining power in (re)negotiation as well as the political influence in the Pentagon of the largest defense contractors will increase. Consequently, more superior profit became attainable. Hence, we have the following hypotheses:

H1: The defense contractors' excessive profitability relative to their industry peers became more pronounced after 1992.

To test H1, we regressed various measures of excessive profit onto a dummy variable that takes the value of one if the year is post 1992 and zero otherwise. Table 7 reports the regression results.

Table 7 shows that excessive profitability, measured by ROA and PMR, increased after 1992. This result holds regardless of whether the size is matched by total assets or revenue. However, the magnitude of the increase, as well as the statistical significance of the change, is more pronounced if size is matched by revenue. We don't find any statistically significant difference in ROCE and OMR between pre- and post-1992 periods.

Table 7. The Excessive Profitability Increased After 1992

Independent Variables	Dependent Variable: Industry-Year-Size Matched Excessive Profit							
	Size Matched by Total Assets				Size Matched by Revenue			
	ROA (N=3,307)	ROCE (N=3,307)	PMR (N=3,307)	OMR (N=3,307)	ROA (N=3,352)	ROCE (N=3,352)	PMR (N=3,352)	OMR (N=3,352)
Intercept	0.0072	0.0505	-0.0003	-0.0034	0.0048	0.0589	-0.0009	0.0012
Post-1992 Dummy (t-value)	**0.0076*** (2.99)**	0.0053 (0.57)	**0.0048* (1.69)**	0.0006 (0.16)	**0.0097*** (3.68)**	-0.0074 (-0.63)	**0.0077*** (2.96)**	-0.0020 (-0.72)

Notes. * indicates 10% significance level, ** indicates 5% significance level, *** indicates 1% significance level

Because most dramatic defense industry consolidation happened after 1992, we believe that the above evidence reasonably supports the conjecture that the industry consolidation made the excessive profits of defense contractors more attainable.

Cross-Sectional Variation Determinant: Corporate Governance

Another possible determinant of excessive profit is the quality of corporate governance. Laffont and Tirole (1993) pointed out that the information asymmetry between the government and the contractors could give rise to the "extraction of information rents" that is associated with potential excessive profits. Based on this observation, we conjectured that a better governed corporation would be less likely to engage in such opportunistic and unethical "rent seeking" behavior. Hence, we have the following hypothesis:

H2: The defense contractors' excessive profitability relative to their industry peers increased with the poorer corporate governance.

To test H2, we referred to the finance literature for empirical measures of corporate governance. Several key governance mechanisms are documented to have impact on the governance quality. First, Jensen (1993) argued that the separation of CEO and chairman of the board is an important feature of good corporate governance because otherwise the CEO is given too much power and too little oversight. A number of other studies (Goyal & Park, 2002; Lipton & Lorsch, 1992) also supported the importance of the separation of CEO and chairman. Second, most researchers believe that the quality of oversight deteriorates when the board gets bigger due to "free-rider" problem (Boone, Field, Karpoff, & Raheja, 2007; Yermack, 1996). Finally, board independence, as measured by the percentage of independent directors, plays a role in limiting the opportunistic behavior of the management arising from the conflict of interest (Brickley & James, 1987; Weisbach, 1988; Rosenstein & Wyatt, 1990). We therefore regressed our various measures of excessive profit onto the corporate governance variables mentioned above. Table 8 reports the regression results. Note that we construct our corporate governance variables based on the firms' proxy statements and other relevant SEC filings.

Table 8. The Excessive Profitability and Corporate Governance

Independent Variables	Dependent Variable: Industry-Year-Size Matched Excessive Profit							
	Size matched by Total Assets				Size matched by Revenue			
	ROA (N=3,307)	ROCE (N=3,307)	PMR (N=3,307)	OMR (N=3,307)	ROA (N=3,352)	ROCE (N=3,352)	PMR (N=3,352)	OMR (N=3,352)
Intercept	0.0097	0.0528	0.0003	-0.0041	0.0087	0.0491	0.0015	-0.0005
CEO-Chairman Duality Dummy (t-value)	**0.0084** (2.48)**	0.0062 (0.60)	**0.0116*** (3.06)**	0.0055 (1.12)	**0.0076** (2.18)**	0.0048 (0.46)	**0.0098*** (2.84)**	0.0035 (0.97)
Board Size (t-value)	-0.0004 (-0.38)	0.0192 (0.76)	-0.0007 (-0.50)	0.0011 (0.88)	-0.0004 (-0.41)	0.0005 (0.42)	0.0005 (0.41)	**0.0023** (2.01)**
Board Independence (t-value)	-0.0132 (-0.76)	-0.0237 (-0.56)	-0.0140 (-0.62)	-0.0151 (-0.69)	0.0014 (0.08)	-0.0263 (-0.46)	-0.0143 (-0.72)	-0.0172 (-0.90)

Notes. * indicates 10% significance level, ** indicates 5% significance level, *** indicates 1% significance level; CEO-Chairman dummy takes value of one if the CEO is also the chairman; board size is defined as number of directors; board independence is defined as the percentage of independent directors in the board.

Table 8 shows that excessive profitability, measured by ROA and PMR, is higher for those firms with CEOs also holding title of the chairman of the board. This result holds regardless of whether the size is matched by total assets or revenue. Board size and board independence do not appear to have any impact on any measure of excessive profitability except that board size marginally affects the excessive profitability measured by OMR. Similar to Table 7, we found few results in ROCE and OMR columns.

The Robustness Test

In the section titled Time Series Variation Determinant, we suggested that industry consolidation plays a role in determining excessive profits of defense contractors. Moreover, in the section titled Cross-Section Variation Determinant we found that the poorer quality of corporate governance measured by the duality of CEO and chairman of the board is positively associated with the excessive profits. Although unlikely, we cannot completely refute the possibility that these two factors, industry consolidation and corporate

governance, have confounding effects. To make sure one factor does not subsume the other, we ran a multiple regression by including both the post-1992 dummy and the CEO-Chairman dummy as independent variables. Table 9 reports the results.

The basic result of Table 9 is that the two determinants we identified in previous sections do not subsume each other. The magnitudes as well as statistical significances appear to be lower than seen in Tables 7 and 8. However, the coefficients remain both statistically and economically significant.

Table 9. Two Determinants of Excessive Profitability: Industry Consolidation and Corporate Governance

Independent Variables	Dependent Variable: Industry-Year-Size Matched Excessive Profit							
	Size matched by Total Assets				Size matched by Revenue			
	ROA (N=3,307)	ROCE (N=3,307)	PMR (N=3,307)	OMR (N=3,307)	ROA (N=3,352)	ROCE (N=3,352)	PMR (N=3,352)	OMR (N=3,352)
Intercept	0.0072	0.0505	-0.0003	-0.0034	0.0048	0.0589	-0.0009	0.0012
Post-1992 Dummy (t-value)	**0.0060** (2.13)**	0.0050 (0.48)	**0.0042* (1.58)**	-0.0015 (-0.36)	**0.0088*** (3.04)**	-0.0028 (-0.36)	**0.0056** (1.96)**	-0.0038 (-1.26)
CEO-Chairman Duality Dummy (t-value)	**0.0064** (2.25)**	0.0032 (0.33)	**0.0108*** (2.58)**	0.0063 (1.16)	**0.0058** (1.96)**	0.0077 (0.58)	**0.0067* (1.74)**	0.0057 (1.42)

Notes. * indicates 10% significance level, ** indicates 5% significance level, *** indicates 1% significance level; alternatively, we also include the board size and the board independence in addition to these two dummy variables, and the results are little changed.

Conclusion

In this study, we used an innovative industry-year-size matched measure of excessive profit and investigated the long-controversial issue of the defense contractors' alleged superior profitability. Using alternative profit measures, our results indicate that defense contractors earn excessive profits relative to their industry peers. This result is strongest when profit is measured by ROA, ROCE, or PMR. The evidence of excessive profit is less consistent if profit is measured by OMR. Another important result from this research is that the defense contractors' excessive profit is more pronounced after 1992, consistent with the conjecture that the significant defense industry consolidation after 1992 enabled superior profitability due primarily to both the strong bargaining power and increased political influence of the remaining firms. A final research result is that poor corporate governance, as measured by the duality of the CEO and the chairman of the board, leads to defense contractors' higher excessive profitability.

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The Excessive Profits of Defense Contractors: Evidence and Determinants

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Research Questions

- Q1: Do defense contractors earn excessive profits at the expense of taxpayers?

- Q2: If yes, what are the determinants of excessive profits?

Do Defense Contractors Earn Excessive Profits?

- No consensus among academics, government, elected representatives, and the industry.
- The Aerospace Industries Association (AIA), has consistently insisted that " Defense industry profitability lags significantly behind its industry peers."
- A General Accounting Office (GAO) report in 1980s found that defense contractors normally earned a higher Return On Assets (ROA) than their commercial counterparts.
- In 2009, a Department of Defense (DoD) sponsored project carried out by the Institute for Defense Analysis (IDA) confirms that the operating margin of defense industry is lower than that of other sectors. However, the profit is "adequate" to sustain defense industry firms because they enjoy a more favorable financing structure.
- What does the academic literature (assuming academics are relatively independent and hence are less subject to a conflict-of-interest problem) say about this controversial issue?

The Literature Review on the Excessive Profits of Defense Contractors

- Early evidence was mixed.

  Weidenbaum (1968), Bohi (1973),
  Agapos and Galloway (1970), Stigler and Friedland (1971).

- The studies in the 1980s and 1990s are less divided in that generally they support the proposition that defense industries earn higher profits than their non-defense peers.

  Carrington (1986), Trueger (1991), Lichtenberg (1992).

- The major explanation of the excessive profits is the cost-shifting hypothesis, though a more recent 2002 study casts doubt on the validity of this explanation.

  Rogerson (1992), Thomas and Tung (1992). McGowan and Vendrzyk (2002)

- The academic studies on the profitability of defense contractors almost stopped after 1990s, leaving an almost two decade blank.

The Objective of This Paper

- First, we fill in an almost two-decade gap that was left blank by the literature, i.e., we use up-to-date data to investigate whether defense contractors earn excessive profits. Our contribution to this goal is beyond a pure extension of timeline. Namely, we employ an innovative industry-year-size matched excessive profit measure to better capture the "excess" of the defense contractors' profitability.

- Secondly, given that we have found the evidence supporting the existence of excessive profits and the lack of consensus on the explanations of excessive profits, we provide alternative determinants of excessive profitability.

Data

- fedspending.org: Top 500 recipients (by dollar awarded) of defense contract awards for year 2008.

Of which we find

- 112 publically traded firms, covering 24 unique industry sectors as defined by 2-digit SIC.

Using stock tickers to map into the Compustat database

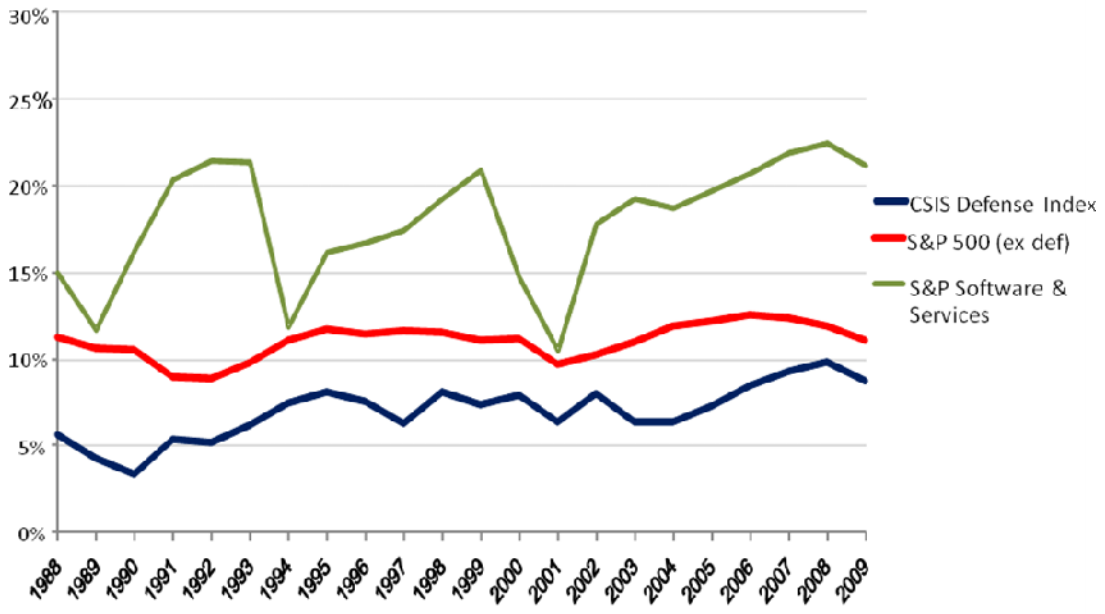
- 4,099 sample firm-years during 1950-2010

Research Design: Measuring Excessive Profits
What Does Not Make Sense?

- **A very common and seemingly sensible method is to compare the profitability measures of defense contractors with similar measures of the member firms of an index.**

Figure 1: Defense Industry Operating Margin—

the Lowest Returns Amongst Its Peers (Reproduced from AIA report)



Critique of "Defense vs. S&P Index " Approach
Why Not Make Sense?

- Q: What implications concerning defense contractors' excessive profits, if any, can be drawn from the Figure 1?

Our answer: None!

- It's meaningless to use a very broadly defined index as the benchmark for inferring the defense contractors' normal profitability. The defense contractors, as a whole or as individual firms, and the broad market, are two different animals.

- Even a narrowly defined index, such as a manufacturing index, is also problematic. The bottom line is: the defense contractors span a wide range of industries. For instance, our 112 public U.S. firms on the 2008 top 500 list cover 24 unique 2-digit-SIC codes. If measured by 4-digit-SIC codes, the number goes up to 56 industries!

- As pointed out by McGahan and Porter (2002), profitability is very industry-specific. Different industries have different risk exposures, competitions, and entry barriers, among many others. Therefore given the wide industry representation of defense contractors, the correct benchmark for inferring defense contractors' normal profitability (and hence excessive profitability) must focus on the individual firm level.

- There is no one-size-fits-all benchmark, not the S&P, not a manufacturing index, not any readily available index.

Research Design: Measuring Excessive Profits
What Does Make Sense?

- Based on the theoretical literature, we propose an ***industry-year-size*** matched measure to assess the excessive profitability of defense contractors.
  - McGahan and Porter (2002) document the importance of year and industry on accounting profitability.
  - Extensive literature demonstrates that firm size should be considered in constructing a benchmark for comparison (Albuquerque 2009, Dechow, Hutton, and Sloan 1996).
  - Hence, we devise an industry-year-size matched excessive profit measure *for each individual firm-year* and in turn use it as the basis for analyzing our research questions.

Measuring Excessive Profits: Industry-Year-Size Matched Proxy

- For each of the 4,099 firm-years, we try to find a benchmark firm-year whose profit becomes the proxy for "normal profit" of the firm-year investigated.

- Specifically, we go to *the same industry-year* where industry membership is defined as 4-digit SIC codes, and identify the *non-defense* (i.e., not on our 112-firm list) firm that has the best size match (where size is alternatively defined as either total assets or total revenue) with our defense firm-year.

- The difference between the profit of the firm-year investigated and the profit of the benchmark firm-year will be the measure of "excessive profit".

Empirical Results

- Table 5 The Excessive Profitability of 4,099 Firm-Years during 1950-2010

Panel A: Size matched by Total Assets

	N	Mean	Min	Max	Std Dev	t	P-value
Excessive ROA(%)	3,809	1.12	-23.49	44.17	7.08	9.77****	<0.0001
Excessive ROCE(%)	3,314	3.65	-143.64	175.57	25.73	8.08****	<0.0001
Excessive PMR(%)	3,809	0.28	-31.82	74.56	7.87	2.22**	0.03
Excessive OMR(%)	3,777	-0.09	-59.59	257.33	10.32	-0.52	0.60

Panel B: Size matched by Total Revenue

	N	Mean	Min	Max	Std Dev	t	P-value
Excessive ROA(%)	3,825	1.04	-21.89	44.37	7.29	8.80****	<0.0001
Excessive ROCE(%)	3,246	3.71	-142.09	178.70	26.08	8.10****	<0.0001
Excessive PMR(%)	3,825	0.45	-31.82	74.91	7.23	3.85***	0.0001
Excessive OMR(%)	3,793	0.35	-48.23	69.29	7.80	2.77***	0.006

Empirical Results (cont'd)

- Table 6 The Excessive Profitability Increased After 1992

Independent Variables	Dependent Variable: Industry-Year-Size Matched Excessive Profit							
	Size matched by Total Assets				Size matched by Revenue			
	ROA (N=3,307)	ROCE (N=3,307)	PMR (N=3,307)	OMR (N=3,307)	ROA (N=3,352)	ROCE (N=3,352)	PMR (N=3,352)	OMR (N=3,352)
Intercept	0.0072	0.0505	-0.0003	-0.0034	0.0048	0.0589	-0.0009	0.0012
Post-1992 Dummy (t-value)	0.0076*** (2.99)	0.0053 (0.57)	0.0048* (1.69)	0.0006 (0.16)	0.0097*** (3.68)	-0.0074 (-0.63)	0.0077*** (2.96)	-0.0020 (-0.72)

Empirical Results (cont'd)

- Table 7 The Excessive Profitability and Corporate Governance

Independent Variables	Dependent Variable: Industry-Year-Size Matched Excessive Profit							
	Size matched by Total Assets				Size matched by Revenue			
	ROA (N=3,307)	ROCE (N=3,307)	PMR (N=3,307)	OMR (N=3,307)	ROA (N=3,352)	ROCE (N=3,352)	PMR (N=3,352)	OMR (N=3,352)
Intercept	0.0097	0.0528	0.0003	-0.0041	0.0087	0.0491	0.0015	-0.0005
CEO-Chairman Duality Dummy (t-value)	0.0084** (2.48)	0.0062 (0.60)	0.0116*** (3.06)	0.0055 (1.12)	0.0076** (2.18)	0.0048 (0.46)	0.0098*** (2.84)	0.0035 (0.97)
Board Size (t-value)	-0.0004 (-0.38)	0.0192 (0.76)	-0.0007 (-0.50)	0.0011 (0.88)	-0.0004 (-0.41)	0.0005 (0.42)	0.0005 (0.41)	0.0023** (2.01)
Board Independence (t-value)	-0.0132 (-0.76)	-0.0237 (-0.56)	-0.0140 (-0.62)	-0.0151 (-0.69)	0.0014 (0.08)	-0.0263 (-0.46)	-0.0143 (-0.72)	-0.0172 (-0.90)

Summary of Major Findings

- First, when compared with their industry peers, defense contractors earn excessive profits. This result is evident when profit is measured by Return on Assets (ROA), Return on Common Equity (ROCE), and Profit Margin Ratio (PMR). The evidence of excessive profit is less consistent if profit is measured by Operating Margin Ratio (OMR).

- Secondly, defense contractors' excessive profit is more pronounced after 1992, consistent with the conjecture that the post-1992 significant industry consolidation enabled superior profitability due to both the improved bargaining power and increased political influence of the newly combined firms.

- Finally, defense contractors' excessive profitability increases with poorer corporate governance, as measured by the duality of the Chief Executive Officer (CEO) and the Chairman of the Board.

Questions? Comments? Suggestions?